A White Paper on

Expedited Data Service for AM-1

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Earth Science Data and Information System (ESDIS) Project
Goddard Space Flight Center
National Aeronautics and Space Adminstration

Preface

This white paper provides a description of expedited data service, expressed relative to the EOS AM-1 mission, intended to assist EOS investigators and other users in understanding the capability and limitations of the service.

Questions concerning this paper should be addressed to

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Section 1. INTRODUCTION

1.1 Background

During a re-baselining effort in August of 1994, the EOSDIS was reviewed end-to-end to identify more efficient ways to meet mission requirements and objectives while reducing the system cost. Many compromises were made to reduce overall system development cost to meet the mandated budget. Among the casualties of the exercise was the quicklook capability for science data. Quicklook has historically been the means by which investigators can monitor instrument performance in near real time during all phases of a mission. On many missions quicklook was also instrumental in providing investigators rapid access to data from rare or unexpected scientific events.

A quicklook data service provides many benefits to investigators, so a method of providing certain key functions of this service without violating the budget constraints is being implemented. This service is called expedited data service, and produces temporary level 0 data sets, called expedited data sets (EDSs), which can be used by investigators to support instrument calibration and anomaly investigations prior to the completion of normal production data processing. It should be emphasized that the EOSDIS no longer has any requirements to produce what were formerly called quicklook data products, but now produces only level 0 EDSs which are staged at the DAACs for up to 48 hours, for delivery to investigators at the science computing facilities (SCFs).

1.2 Purpose

This paper provides a description of expedited data service intended to assist EOS investigators and other users in understanding the capability and limitations of the service, and attempts to answer questions which have arisen regarding the proposed expedited data processing operations concept.

1.3 Scope

The description and explanations of expedited data service provided in this document are expressed relative to the AM-1 mission and SN/TDRSS configuration. Expedited data processing operations after AM-1 operations transition to the EOSDIS ground stations in the year 2000, and for the later EOS missions are expected to be similar as long as the current EGS operations concept is maintained (i.e., rate-buffered electronic transfer of mission science data from the EOSDIS ground stations to EDOS at GSFC).

Section 2. OVERVIEW

2.1 Expedited Data Description

Expedited data service produces temporary level 0 data sets, called expedited data sets (EDSs), for delivery to investigators within 2 to 3 hours of data acquisition. EDSs are intended to provide instrument data to investigators, which they need to perform instrument calibrations and anomaly investigations, prior to the availability of level 0 data from the normal production data processing service.

The EOS Data and Operations System (EDOS) provides the data capture and level 0 processing function for data from EOS spacecraft. EDOS receives and captures EOS spacecraft data; processes the data to create level 0 expedited data sets and production data sets; distributes level 0 data to the appropriate destinations; and stores all level 0 data in a backup archive.

Level 0 processing begins at the conclusion of a spacecraft contact session (SCS). Data identified for expedited delivery are processed first and delivered as expedited data sets (EDSs). An EDS (with the exception of ASTER EDSs which are discussed later), typically contains all packets from a single SCID/APID received during a single SCS with the secondary header quicklook flag set. Setting the secondary header quicklook flag is the primary method of identifying data for expedited processing. If the quicklook flags in the data are not set, an EDS that contains all packets from a single SCID/APID received during one SCS can be requested. Since expedited data processing takes precedence over production data processing, the mission data files are examined by EDOS to determine if expedited data processing is required. Expedited data processing is similar to production data processing but does not include data merging, or redundant packet deletion.

Expedited data processing is sized to process two percent of the volume of all data received over a 24 hour period, generally allocated as two percent per instrument. Expedited data processing demands in excess of two percent will be serviced; however, such requests may impact EDOS production data handling services. The packets used for expedited data processing are retained for production data processing. If the quicklook flag in the secondary header is used, the expedited processing is performed automatically. Otherwise, a service request for a specific SCS must be made through the EOC. Service requests for a specific SCS to be processed as expedited data must be received by EDOS at least one hour prior to the start of the affected SCS. Expedited data sets can be requested after a completed SCS in special situations.

2.2 Goals and Objectives

Expedited data handling services will be provided with minimum impact to the normal production data handling services. Specific delays will be minimized to make the EDSs available to the investigators within 3 hours after the end of the SCS. Changes made to the system in order to provide expedited data processing operations must be implemented at no added cost, since no additional funding has been identified to support this capability.

Section 3. OPERATIONS CONCEPT

3.1 Expedited Data Processing Operations Overview

In order for selected instrument data to be expedited through the system, there are certain capabilities which must be available within the various functional areas. The functional area with the most significant impact on expedited data processing operations is the EDOS where the processing is performed, but several other functional areas are required to support the end-to-end expedited data flow.

Figure 3-1 is a data flow diagram for expedited data processing operations. Only those EGS elements required to support expedited data handling are included in this diagram. Brief descriptions of the role of each element in performing expedited data processing operations are provided in the following sections. Additional details of EGS and EDOS operations can be found in the *EGS System and Operations Concept* and the *EDOS Operations Concept documents* respectively.

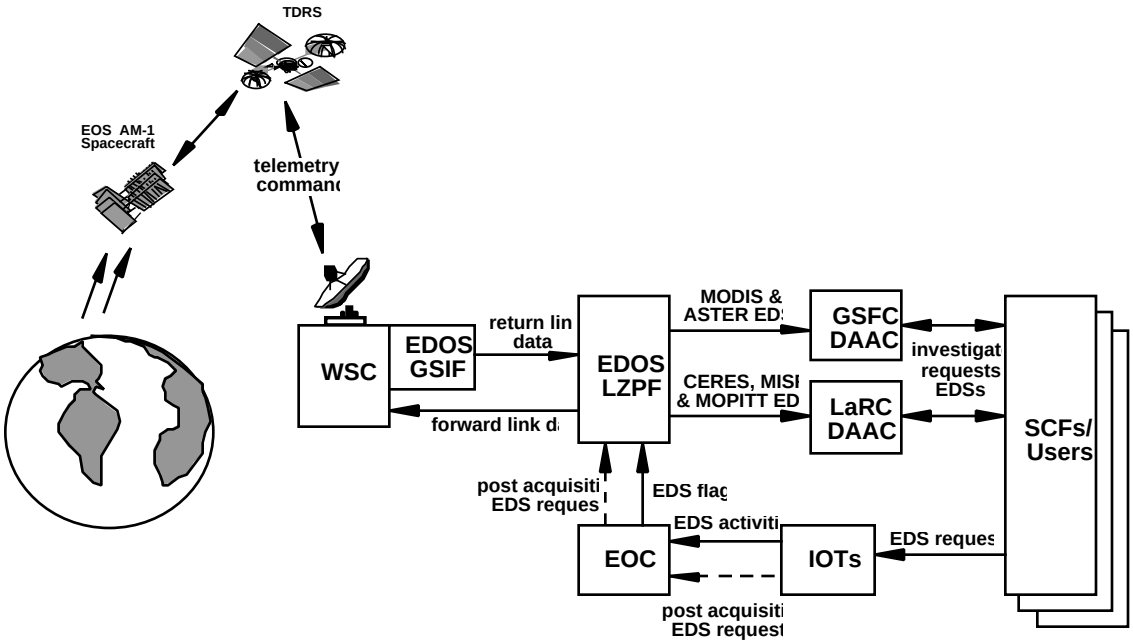

Figure 3-1 EDS Data Flow Overview

3.1.1 Spacecraft

AM-1 is the first in the series of EOS polar-orbiting and low-inclination satellites which will perform global science observations. The AM-1 disciplinary focus is on characterization of the terrestrial and oceanic surfaces; clouds, radiation, and aerosols; and radiative balance. It contains six instruments including two international instruments; CERES (2), MISR, MODIS, ASTER (Japan), and MOPITT (Canada).

The AM-1 spacecraft onboard equipment will format the data from the individual instruments into well identified, time tagged packets. These packets will be further

incorporated into a frame data format which will contain data from all of the onboard instruments, and which adheres to recommendations established by the Consultative Committee for Space Data Systems (CCSDS). The CCSDS standard frame format is called a Channel Access Data Unit (CADU).

CADUs are recorded onto a recorder onboard the AM-1 spacecraft. When commanded, the onboard recorder will playback those data to the spacecraft RF equipment for downlink through the TDRS to the White Sands Complex (WSC).

The CCSDS format lends itself to identification of data for special handling. Quicklook flags are set in the data packets secondary header based on information contained in instrument microprocessor loads or command updates. This capability is built into the instruments and no special handling is required on-board. In this manner, the required data are flagged onboard and identified for expedited handling by the EGS.

3.1.2 Instrument Operations Team

The instrument operations teams (IOTs) are responsible for monitoring the health, safety, and performance of the instruments, and for controlling the operations of the instruments. They accomplish this by monitoring and analyzing the spacecraft and instrument housekeeping data, and by monitoring and analyzing the instrument science data. They interact with the EOC using an instrument support toolkit which resides on a workstation at their facility. An instrument support toolkit is a collection of software executable programs that support remote participation by IOTs in the scheduling, monitoring, and analysis of their instruments. This toolkit running at a workstation constitutes an Instrument Support Terminal (IST). Using ISTs at their facilities, the IOTs can schedule, monitor real-time and playback telemetry, perform analysis, build command procedures, submit command requests, monitor commanding, review ground scripts, submit table loads and microprocessor memory loads, and submit updates to the instrument databases, including setting flags for expedited data processing. All requests from users for expedited data go to the IOTs who send the appropriate command requests to the EOC where the required command procedures are implemented.

3.1.3 EOS Operations Center

The EOC located at GSFC is responsible for operating the spacecraft and coordinating the operations of all the instruments on the spacecraft. The EOC plans and schedules all EOS spacecraft resources and assembles and generates an integrated spacecraft and instrument conflict-free schedule. The EOC merges and validates instrument software loads and command data received from the IOTs, including creating the command loads that set the secondary header quicklook data flags to identify data for expedited processing. The EOC also provides capabilities to forward commands in real time or store them for later transmission. It validates instrument command sequences before transfer to EDOS for uplink to the spacecraft. In addition, the EOC provides limited monitoring of spacecraft and instrument parameters and develops contingency plans for use during spacecraft anomalies.

3.1.4 EOS Data and Operations System

The EDOS provides capabilities for handling EOS spacecraft data compatible with the applicable CCSDS recommendations. EDOS return and forward link processing services provide for the receipt, capture, processing and transfer of all EOS digital data that conform to the applicable CCSDS communications services. Data handling services include forward link real-time processing, return link real-time processing, data capture, rate buffering, and

production processing. The EDOS ground station interface facilities (GSIFs) located at the WSC and EOSDIS ground stations provide short-term data capture for the high rate return link data and forwarding of high rate return link data to the EDOS level 0 processing facility (LZPF) at the GSFC. The LZPF provides forward link processing and high and low rate return link service processing. All data handling capabilities include data quality assurance and accounting. EDOS also maintains a backup archive of all level 0 data.

Production data handling services for mission data received from the EDOS return link service at the GSIF are provided by the EDOS LZPF. The services provided are production data processing and expedited data processing. Production data processing is the process by which packets from one or more SCSs are sorted by APID, forward-ordered by sequence counter, and quality checked. A production data set (PDS) is generated by deleting redundant and previously processed packets and adding quality and accounting summary information.

Expedited data processing is similar to production data processing, with the following exceptions. The contents of an EDS are limited to data received during a single SCS. Redundant packets within an EDS are not removed. This redundancy results from the same section of the spacecraft recorder being dumped more than once during a single contact session. Redundant packets between contacts are not removed. EDS processing focuses on a single SCS and does not take into account any data that arrived in a previous contact session. Therefore, two EDSs could contain redundant data.

The packets contained in an EDS are included in production data processing for the applicable SCSs. The EGS is sized to accomodate a volume of expedited data processing limited to two percent of all return link data received over a 24-hour period, generally allocated as two percent per instrument.

3.1.5 EOSDIS Backbone Network

EBnet provides wide-area communication circuits and facilities between and among various EGS elements to support mission operations and to transport mission data between EOSDIS elements. EBnet is responsible for transporting spacecraft command, control, and science data on a continuous basis, 24 hours a day, 7 days a week. EBnet transports mission-critical data related to the health and safety of on-orbit space systems and science telemetry data. The latter includes data collected from spacecraft instruments and various levels of processed science data including expedited data sets, production data sets, and rate-buffered science data. In addition to providing the wide-area communications through common carrier circuits for internal EOSDIS communications, EBnet serves as the interface to other systems such as DAACs, users, and the NASA Science Internet (NSI). EBnet also includes Exchange Local Area Networks (LANs) which provide communications between the wide-area network and site-specific LANs.

3.1.6 Distributed Active Archive Center

The DAACs provide facilities and operations for the production, archive, and distribution of EOS science data products. A major function of the DAAC is to ensure that data are accessible to the users. Using specially designed software and algorithms provided by the investigators and installed at the DAACs, the DAACs process the science data to meet the unique requirements of the science community.

The GSFC and LaRC DAACs receive and stage the EDSs from EDOS. Investigators residing at the SCFs typically request expedited data from the DAACs by entering a subscription order with the DAAC to be notified immediately whenever expedited data of

interest to them is received by the DAAC. The DAAC will send a data availability notice to notify the investigator that the EDS is available at the DAAC, allowing the investigator to pull the data from the DAAC at their convenience; the subscription order can also specify that the data be forwarded to the investigators SCF immediately upon receipt of the EDS by the DAAC.

Since the data in each EDS are included in one or more PDSs covering the same time period, EDSs are deleted by the DAAC after a PDS which contains the corresponding EDS data is received. EDSs are kept by the DAACs for 48 hours and then deleted, even if the associated PDS has not been received by the DAAC. Note that for AM-1, ASTER PDSs are sent directly to the ASTER GDS and never go to the GSFC DAAC which receives the ASTER EDSs.

3.2 Expedited Data Processing Operations Concept

The following is a brief description of the present concept of operations for production data processing followed by a description of expedited data processing. Other aspects of EGS operations are not addressed here. Additional detail describing EGS operations can be found in the *EGS System and Operations Concept document.* Additional details describing EDOS operations can be found in the *EDOS Operations Concept.*

3.2.1 Mission Planning

The science community, principal investigators, instrument operations teams, and the international partners working together create a long-term science plan and a baseline activity profile which integrates the activities of the instruments and spacecraft subsystems. This planning and scheduling process culminates in an initial and final scheduling process, resulting in the generation of a target day detailed activity schedule by the flight operations team for each day of spacecraft and instrument operations. The final target day schedule is updated as necessary to be compatible with changes in negotiated support schedules, and late change data acquisition requests or targets of opportunity.

The use of expedited data will be included in the long term plan for events occurring during launch and early orbit. Subsequent to those planned events, during mature operations, the need for EDSs will be identified and initiated by the IOT, and nominally included in the instrument microprocessor updates or command loads as flags to be inserted in the required data on board the spacecraft.

3.2.2 Data Capture and Level 0 Processing

The data capture and level 0 processing function receives and captures spacecraft data; processes the data to create level 0 expedited data sets and production data sets; distributes level 0 data to the appropriate destinations; and stores all level 0 data long-term as production data sets in a backup archive.

During a TDRS contact EDOS captures the high rate Ku-band data stream, which contains both science and housekeeping playback data, from the SN return link. EDOS processes the physical channel data and, at the conclusion of a SCS, begins level 0 processing of the data into EDSs and PDSs. These processes are described in the following sections

3.2.2.1 PDS data flow

Figure 3.2-1 shows the nominal PDS data flow. In the science formatting equipment on-board the spacecraft, the instrument data are packetized and formatted into data units in

accordance with the applicable CCSDS recommendations. These data are recorded onboard the spacecraft on a solid state recorder. The EOC commands the AM-1 spacecraft via EDOS and SN to playback the SSR data. The data from the recorder are played back to the ground via TDRSS during a spacecraft contact session. Those data are captured on the ground by the EDOS GSIF at the White Sands Complex and transmitted at a reduced rate via EBnet to the EDOS LZPF at GSFC after the spacecraft contact session has completed. The telemetry data is captured at the EDOS LZPF and demultiplexed by APID. At the conclusion of the store and forward transfer, initial data set processing is performed; communication artifacts are removed, the data is time ordered, and redundant data is removed. After all the data for a data set has been received, nominally 2 hours based on spacecraft time for most data sets, final processing is performed on the data set (analyses have shown that staging data in 2-hour data sets optimizes the efficiency of level 0 processing, however, a 2-hour data set requires data from at least 2 SCSs). The processed data in the form of production data sets are then forwarded to the GSFC and LaRC DAACs where standard data products and other data products are created and distributed to users.

ASTER production data sets are placed on physical media and shipped to the ASTER GDS. All production data sets are also placed on physical media for storage in the EDOS level 0 backup archive.

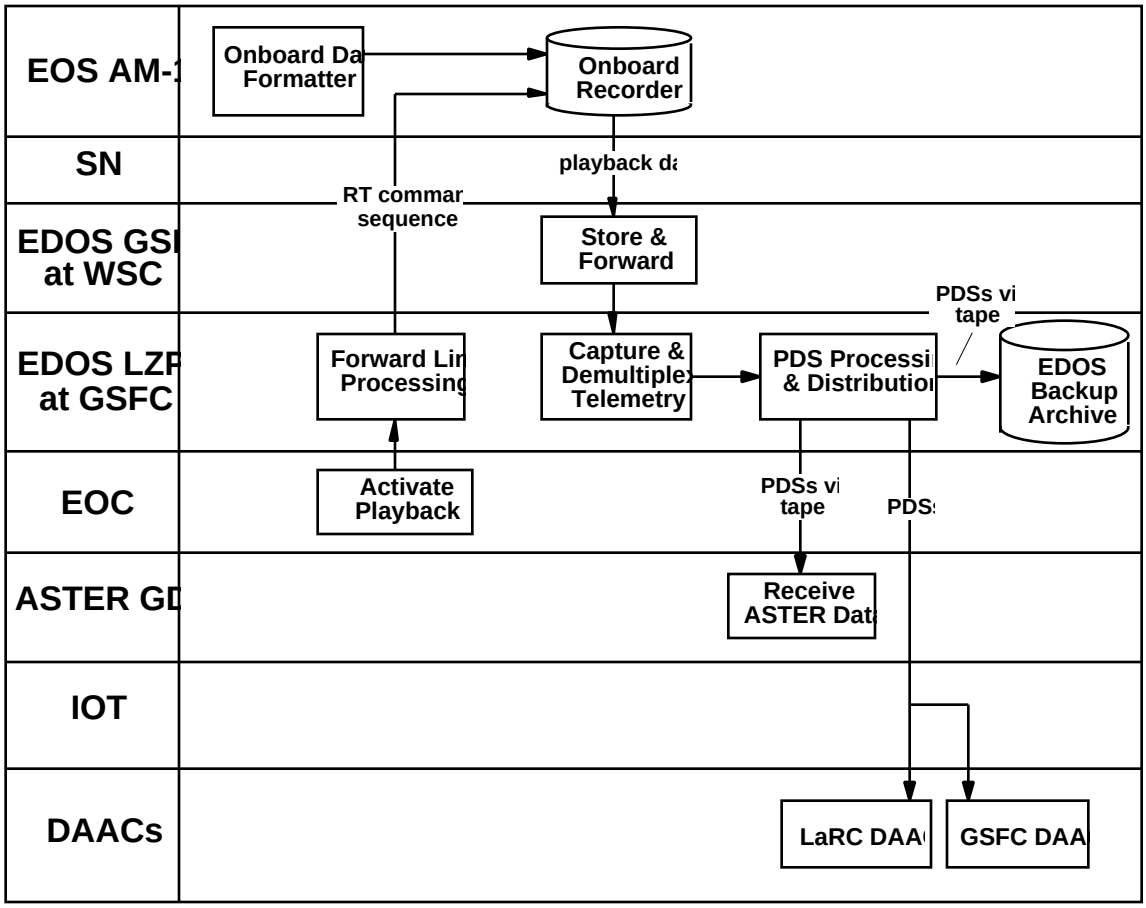

Figure 3.2-1 Nominal PDS Data Flow

3.2.2.2 EDS data flow with flag set

There is no difference in data handling for expedited data and normal production data until the data reaches the EDOS LZPF at GSFC. For nominal expedited data processing, a quicklook flag in the packets which contain the data to be expedited is set onboard the spacecraft. The setting of the quicklook flag is initiated by the IOT via an onboard microprocessor load or command update.
Figure 3.2-2 shows the nominal EDS data flow using the quicklook flag. The IOT specifies the EDS request activity on the mission timeline, using the IST, making it part of the one day schedule (ODS). If applicable, the IOT also sends an accompanying instrument microprocessor load to the EOC. Using the ODS, the IOT builds the command load. An IOT can thus set the quicklook flag via either an instrument microprocessor load with an accompanying EDS activity label (comment), or an instrument stored command load built from an EDS activity request. Either approach provides the flight team and all of the IOTs with activity-level visibility into the onboard setting of the quicklook flag. During the appropriate contact, the EOC will uplink the desired command and/or microprocessor loads via EDOS and the SN.

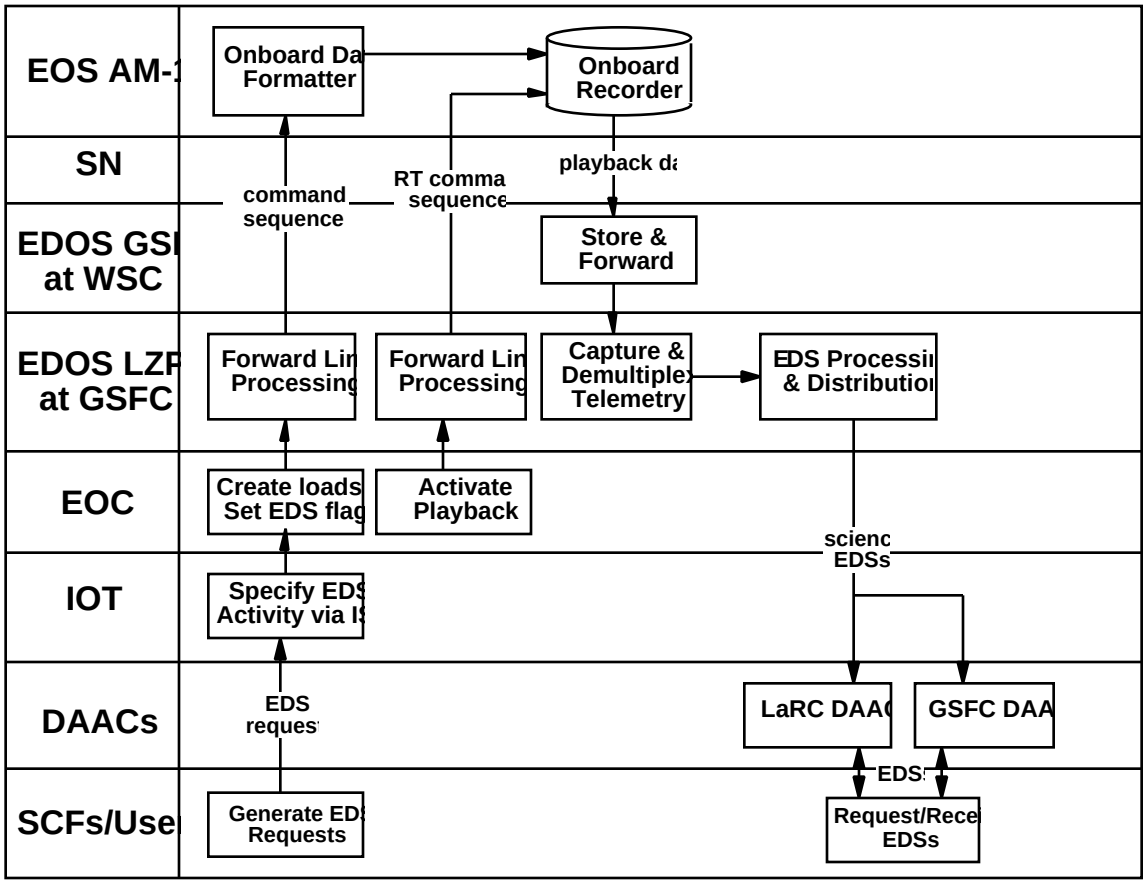

Figure 3.2-2 Nominal EDS Data Flow with Q/L flag set

The process is then identical to production data processing except for the following. In EDOS those data which are flagged for expedited processing are processed first. EDS processing limits the data staging to a single SCS, compared with PDSs which are typically staged in 2-hour data sets and require data from at least 2 SCSs. Redundant packets within an EDS are not removed. This redundancy results from the same section of the spacecraft recorder being dumped more than once during a single contact session. Redundant packets between contacts are not removed. EDS processing focuses on a single SCS and does not

take into account any data that arrived in a previous contact session. Therefore, two EDSs could contain redundant data.

EDSs are forwarded to the DAACs where they are made available to investigators, typically by a subscription order. Since the data in each EDS is included in a PDS for the same coverage period, the corresponding EDSs are deleted by the DAAC after the PDS is received. After 48 hours, the EDS will be deleted from the DAAC even if the associated PDS has not been received.

3.2.2.3 EDS data flow with no flag set

It is possible to produce an EDS even if the data are not flagged on-board the spacecraft. This requires that EDOS operations identify the data which are to be expedited by SCS and APID. All of the data contained in that SCS with the specified APID will then be made into an EDS . The time and resources
required for this method of processing is prohibitive; and so, it is expected that the use of this procedure will be rare.

Figure 3.2-3 shows the EDS data flow without the quicklook flag set. The

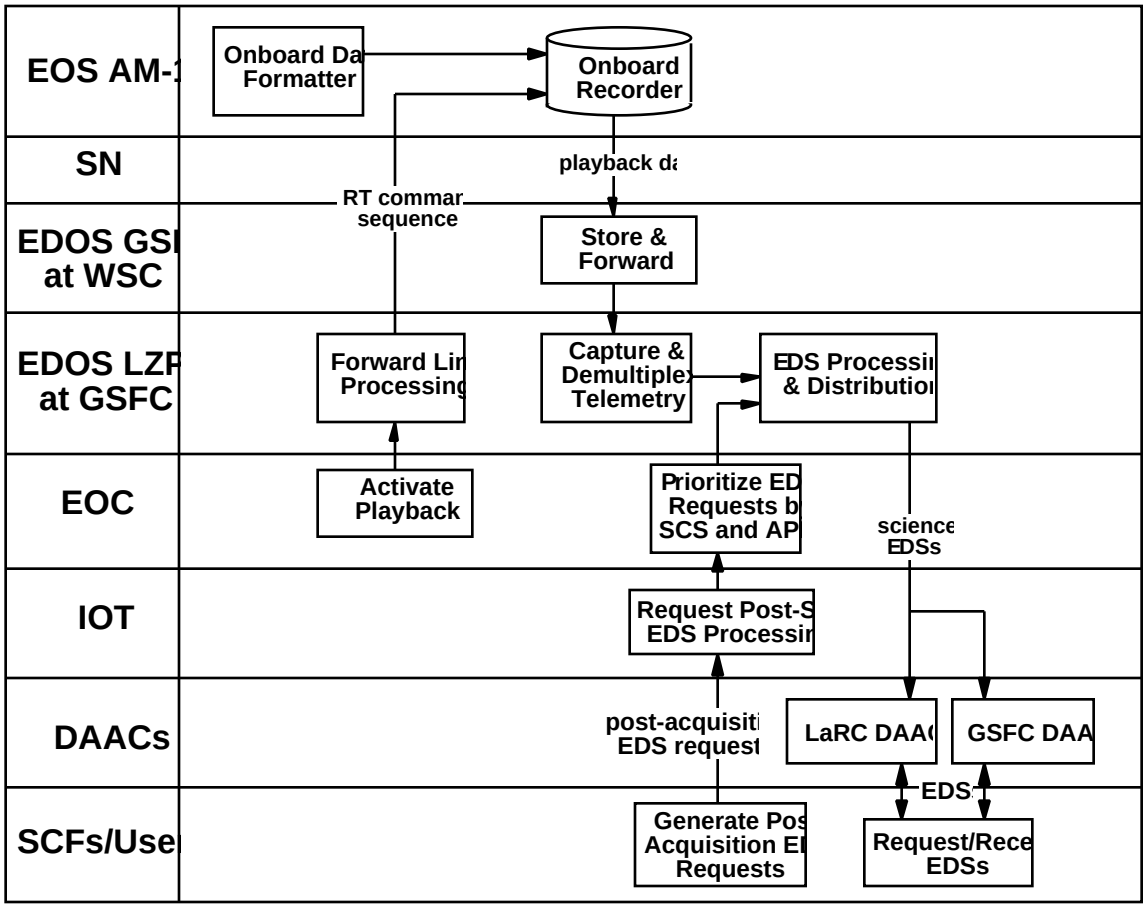

Figure 3.2-3 EDS Data Flow without Q/L flag set

process differs from the nominal EDS data flow in that since no quicklook flags

are set in the data, EDOS must be told which data are to be expedited. In this case, the IOT requests the EOC to have EDOS process a specific APID for a specific SCS. The EOC prioritizes all requests for expedited data processing by SCS and APID, factoring in any EDS activities already on the mission timeline for the next SCS, and forwards the requests to EDOS. Based on the specified APID and SCS, the requested data is processed ahead of other data and forwarded to the DAACs as an EDS for distribution to the investigator requesting it.

3.2.3 Data Ordering and Distribution

The science data ordering, processing, archiving and distribution function generates and archives standard data products from all EOS level 0 data; accepts user orders for data products; performs science data quality assessment; and generates and distributes products to investigators and users.

The GSFC and LaRC DAACs receive and stage the EDSs from EDOS. Investigators residing at the SCFs typically request expedited data from the DAACs by entering a subscription order with the DAAC to be notified immediately whenever expedited data of interest to them is received by the DAAC. The DAAC will send a data availability notice to notify the investigator that the EDS is available at the DAAC, allowing the investigator to pull the data from the DAAC at their convenience; the subscription order can also specify that the data be forwarded to the investigators SCF immediately upon receipt of the EDS by the DAAC.

3.2.4 Modes

There are non-nominal modes of mission operations that affect expedited data service. This section briefly describes several of these modes. Specific approaches to the use of expedited data service for these modes are TBD.

3.2.4.1 Launch and Early orbit

During launch and early orbit when the instruments are being activated and initial calibration procedures are being performed, the limitations on percentage of expedited data allowed (i.e., 2%) may be relaxed. This is acceptable since the overall production data service volume is much lower during the instrument activation phases than during mature operations when instrument operations are stabilized.

3.2.4.2 Contingency

There are certain spacecraft and/or instrument conditions related to health and safety thresholds which if approached or exceeded will dictate a change from the nominal modes of spacecraft and/or instrument operations. These contingency modes may be triggered by a variety of abnormal situations or conditions. Spacecraft emergencies will result in the suspension of instrument operations until the emergency is resolved and spacecraft operations are returned to normal. Instrument contingencies can take many forms. While an instrument problem will generally override the need for normal production processing of instrument science data, during these periods the need for expedited data processing could be dramatically increased depending upon the specific situation.

3.2.4.3 Special Conditions

There are special conditions, typically preplanned periodic events such as special calibration sequences or maneuvers or orbit adjust maneuvers, for which procedures are established.

These events will impact expedited data processing operations, either increasing or decreasing the volume depending upon the special condition being addressed.

There are also situations which are unplanned, such as an unexpected scientific or cataclysmic event, for which preplanned procedures are not in place. In this case, the FOT using information and data from the IOTs working in concert with the scientific community, establish an acceptable mode of operation. This type of event is expected to require a substantial increase in the quantity of expedited data requested.

3.2.5 Special Considerations for AM-1 ASTER Instruments

There are certain considerations unique to AM-1 ASTER instruments. Because of the high data rate, the maximum amount of ASTER expedited data per spacecraft contact session is limited to one minute per orbital period (not 2%).

The bandwidth of the transmission line from the GSFC DAAC to the ASTER GDS is being sized to handle data files containing the equivalent of two ASTER scenes per day. This is based on the Japanese expedited data requirement for two scenes per day. However, requests from other ASTER data users (e.g. the JPL science team) could increase the file size beyond the bandwidth limit which could result in delayed delivery of ASTER EDSs to the GDS. This delay would only be the case if the JPL science team (or other ASTER users) requested data from the same SCS as the Japanese, which would put all the data into the same EDS. If the request from other ASTER users was on a different contact session, then the Japanese would not request or receive that EDS.

The format of EDSs for ASTER is the same as the ASTER PDSs. It is different than the format of EDSs for the other instruments. Normally, EDSs are limited to all packets from a single APID received during a single SCS with the secondary header quicklook flag set, which is the nominal mode of operation, or all packets from a single APID received during one SCS. In order to maintain consistency with the pre-arranged formats for ASTER PDSs, Aster EDSs will contain multiple APIDs within a virtual channel taken during a single SCS. These formats are to accomodate the unique (TDM-like) usage of the ASTER packets. Aster does not receive EDSs or PDSs made of single APIDs. The ASTER PDS format was implemented by EDOS in response to a request from the ASTER team.

3.2.6 Limitations

As a result of the re-baselining effort in August of 1994, the requirements for the EOSDIS to produce quicklook products was deleted and replaced with requirements to produce expedited data sets. This has eliminated the production of quicklook science data (level 1 - level 4) from the EOSDIS Core System (ECS). Quicklook science data has been replaced with expedited data which are level 0 data sets delivered to the DAACs within a nominal time of 2 to 3 hours, where they are staged for up to 48 hours for delivery to the SCFs. EDSs are intended to support instrument calibrations and anomaly investigations.

There are many problems which can prevent expedited data from reaching the DAAC in the allotted time following the completion of a spacecraft contact session. Equipment problems at either the GSIF or EDOS ahead of the level 0 processor can cause a backlog which will be cleared on a first-in-first-out basis since the quicklook flag can not be detected prior to level 0 processing. The availability of EDSs at the DAACs within 3 hours after the conclusion of a spacecraft contact session is a goal. No critical functions should be based on the availability of EDSs.

The system is being developed with sufficient margin to allow each instrument to have up to 2% of their daily data volume processed in the expedited mode. Aggregate volumes of expedited data beyond that allowance may impact EDOS production data handling services. The 2% can be bartered among instruments, but care must be taken to insure that limitations on the aggregate expedited data volume in EDOS are not exceeded. In some cases, communications lines may only be sized for 2% expedited data for particular instruments. In those cases, bartering may not achieve the desired decrease in time for data availability since the limited bandwidth will effectively increase the time required to transmit the larger data set. Each case must be considered on an individual basis.

Section 4. FREQUENTLY ASKED QUESTIONS

1. Does the 2% per day limit apply to all instruments regardless of data rate?

This 2% rule applies to all instruments regardless of data rate/volume. ASTER has an additional restriction not to exceed 1 minute per orbital period due to the high data volume.

2. Who monitors the 2% usage?

IOTs and/or instrument science teams are responsible for policing their own usage and adhering to the 2% limit. EDOS will keep track of the volume of expedited data processed post event, but generally will only raise an issue if the volume of expedited data processing begins to impact EDOS production data handling services. The FOT will assist in troubleshooting as needed but will generally neither monitor nor manage routine EDS usage. Excessive use of the expedited data service will be reported to the project scientist.

3. Can the allocated EDS be saved-up for later use?

No. The 2% volume allowance can not be carried over to the next day**.** Use or lose!

4. How is the 2% calculated against an instrument's allocated EDS time when there are no EDS flags and the data from the entire spacecraft contact session is processed?

Because of the way that time and resources are required to handle post event expedited data processing by EDOS, each event is considered to use the entire 2% daily allocation.

5. Are there format differences between an EDS and a PDS?

The EDS format is exactly the same as that for the Production Data Set (PDS). There are data and information differences however. The content of an EDS is limited to data received during a single SCS. There is a flag which indicates the type (‘P’ for PDS and ‘E’ for EDS). Redundant packets within an EDS are not removed. In addition, since EDS processing focuses on a single SCS and does not take into account any data that arrived in a previous contact session, redundant packets between contacts are not removed. Therefore, two EDSs could contain redundant data.

6. What problems will occur if the daily EDS allocation limits are greatly exceeded?

EDOS production data handling services for all instruments will be delayed.

7. How can I order expedited data?

Data can only be identified for expedited data processing by the IOTs, so investigators must coordinate requests for data to be identified for expedited data service with the IOTs.

After data identified for expedited data service has been received by EDOS and the EDSs generated, the GSFC and LaRC DAACs receive and stage the EDSs from EDOS. Investigators residing at the SCFs typically request expedited data from the DAACs by entering a subscription order with the DAAC to be notified immediately whenever expedited data of interest to them is received by the DAAC. The DAAC will send a data availability notice to notify the investigator that the EDSs are available at the DAAC, allowing the investigator to pull the data from the DAAC at their convenience; the subscription order can also specify that the data is to be forwarded to the investigators SCF immediately upon receipt of the EDS by the DAAC.

8. Can ECS subset an EDS (based on user request) or must the user accept the entire EDS for a given TSS?

No. There is no subsetting of EDSs.

Section 5 ROAD TO AM-1 LAUNCH

The use of expedited data service is heavily influenced by many factors and groups. During the next several months, there are many issues to be addressed and resolved that will require the participation of all parties including ESDIS managers, system developers, mission operators (both flight and ground), instrument developers and operators, and investigators and other users of the data. While not an exhaustive list, this section identifies some of the issues needing discussion and resolution prior to AM-1 launch.

1. The development of a detailed concept of operations for expedited data service. This concept should identify and address both nominal and non-nominal (i.e., launch and early orbit, contingency, and special conditions that may arise) modes of operation. The constraints and limitations on the capability of expedited data service must be identified and well understood by both system developers and users of expedited data. ASTER should be treated as a special case since it is a complex instrument with unique capabilities and has special limitations placed on it.

2. The development of specific guidelines, mission operational procedures, and/or directives governing the use and application of expedited data processing consistent with the requirements currently placed on the EOSDIS. These guidelines and procedures should address issues such as bartering or swapping of allocations between instruments; procedures for instrument contingencies; establishment of priorities among instruments; identification of final decision making authority; and enforcement of limitations and constraints.

3. Establishment of the process and procedures for investigators to interact with the instrument operations teams to identify the data they wish to have expedited, for nominal and non-nominal conditions.